THAT WHICH IS CLAIMED:

1. An adaptable mandrel for spin forming, comprising:

a backing plate;

a first mandrel portion defining a spin forming contour surface and attached to the backing plate;

a second mandrel portion defining a spin forming contour surface removably attached to the backing plate, such that the second mandrel portion is attachable to the backing plate in at least two different positions relative to the first mandrel portion, wherein a first configuration is defined when the second mandrel portion is attached to the backing plate, such that the first and second mandrel portions abut one another and a second configuration when the first and second mandrel portions are spaced from one another to define a mandrel gap; and

at least one mandrel spacer defining a spin forming contour surface, wherein the mandrel spacer is removably attached to the backing plate, and wherein the mandrel spacer is structured and arranged to occupy the mandrel gap while the first and second mandrel portions are spaced from one another in the second configuration, such that the mandrel is adaptable to define at least two different continuous spin forming patterns.

2. An adaptable mandrel according to claim 1, wherein the first mandrel portion is removably attached to the backing plate.

3. An adaptable mandrel according to claim 2, wherein the backing plate includes through-holes and the first and second mandrel portions and the mandrel spacer include at least one bolt and one dowel pin for positioning in the through-holes of the backing plate.

4. An adaptable mandrel according to claim 1, wherein the first mandrel portion defines a shape that is different than a shape of the second mandrel portion.

5. An adaptable mandrel according to claim 4, wherein the first configuration of the mandrel and the second configuration of the mandrel define a non-concentric pattern.

6. An adaptable mandrel according to claim 1, wherein the first and second mandrel portions each define a semicircular shape and the spin forming contour surface defines a convex arc.

7. An adaptable mandrel according to claim 6, wherein the first configuration of the mandrel and the second configuration of the mandrel define a nominally circular pattern.

8. An adaptable mandrel according to claim 6, wherein the semicircular shape of the first and second mandrel portions defines an inner diameter curvature and an outer diameter curvature, and wherein the mandrel spacer defines an inner edge with the inner diameter curvature and an outer edge with the outer diameter curvature.

9. An adaptable mandrel according to claim 6, wherein the semicircular shape of the first and second mandrel portions define an inner diameter curvature and an outer diameter curvature, and wherein the mandrel spacer defines a linear inner edge and a linear outer edge.

10. An adaptable mandrel according to claim 1, wherein the backing plate defines a generally planar surface.

11. A spin forming apparatus in operation, comprising:

a mandrel, comprising:

a backing plate;

a first mandrel portion defining a spin forming contour surface and attached to the backing plate;

a second mandrel portion defining a spin forming contour surface removably attached to the backing plate, such that the second mandrel portion is attachable to the backing plate in at least two different positions relative to the first mandrel portion, wherein a first configuration is defined when the second mandrel portion is attached to the backing plate, such that the first and second mandrel portions abut one another and a second configuration when the first and second mandrel portions are spaced from one another to define a mandrel gap; and

at least one mandrel spacer defining a spin forming contour surface, wherein the mandrel spacer is removably attached to the backing plate, and wherein the mandrel spacer is structured and arranged to occupy the mandrel gap while the first and second mandrel portions are spaced from one another in the second configuration, such that the mandrel is adaptable to define at least two different continuous spin forming patterns;

a metal sheet operably connected to the mandrel, wherein the metal sheet is spin formed on the mandrel to acquire the contours of the spin forming contour surface.

12. A spin forming apparatus according to claim 11, wherein the metal sheet is a welded metal sheet including a first metal sheet welded to a second metal sheet along a weld joint, and wherein the welded metal sheet is spin formed on the mandrel in the second configuration to acquire the contours of the spin forming contour surface.

13. A spin forming apparatus according to claim 11, wherein the metal sheet is a single metal sheet, and wherein the single metal sheet is spin formed on the mandrel in the first configuration to acquire the contours of the spin forming contour surface.

14. A spin forming apparatus according to claim 11, wherein the backing plate includes through-holes and the first and second mandrel portions and the mandrel spacer include at least one bolt and one dowel pin for positioning in the through-holes of the backing plate.

15. A spin forming apparatus according to claim 11, wherein the first mandrel portion defines a shape that is different than the shape of the second mandrel portion.

16. A spin forming apparatus according to claim 11, wherein the first and second mandrel portions each define a semicircular shape and the spin forming contour surface defines a convex arc.

17. A spin forming apparatus according to claim 14, wherein the semicircular shape of the first and second mandrel portions defines an inner diameter curvature and an outer diameter curvature, and wherein the mandrel spacer defines an inner edge with the inner diameter curvature and an outer edge with the outer diameter curvature.

18. A method of manufacturing a spin formed product, comprising the steps of:

converting a mandrel from a first configuration to a second configuration by moving a first mandrel portion relative to a second mandrel portion, wherein the first configuration defines a first continuous spin forming contour surface and the second configuration defines a spin forming contour surface with at least one mandrel gap between the mandrel portions;

inserting at least one mandrel spacer with a spin forming contour surface into the mandrel gap to complete a second continuous spin forming contour surface;

operably connecting a sheet material to the mandrel; and

spin forming the sheet material into the spin formed product.

19. A method as defined in claim 18, further comprising the step of welding at least two metal sheets together to define the sheet material prior to operably connecting the sheet material to the mandrel.

20. A method as defined in claim 19, wherein the welding step comprises a friction stir welding process, such that the metal sheets are joined along a friction stir welded joint.

21. A method as defined in claim 20, wherein the operably connecting step comprises orienting the welded sheet material upon the mandrel prior to spin forming, such that the friction stir welded joint is positioned upon the mandrel spacer.

22. A method as defined in claim 20, further comprising the step of trimming the spin formed product generally along the friction stir weld joint to remove the friction stir weld joint.

23. A method as defined in claim 20, further comprising the step of trimming the spin formed product generally along the friction stir weld joint to remove the friction stir welded joint and the heat affected zone of the welded sheet material.

24. A method as defined in claim 18, further comprising the step of balancing the mandrel prior to operably connecting the sheet metal.